

Analysis. Spring 2013

Let's make a **model of the thing-that's-one-level-beyond-pascal's-triangle**.

Name(s)	_____
Block	_____
Due date	_____

Materials. Your instructor has done this with marshmallows and toothpicks, your group needs to decide what materials to use (and supply your own).

- Make a model analogous to Pascal's triangle which will give coefficients for the expansion of $(a+b+c)^n$
- Like pascal triangles, lets call the first entry level 0.
- The structure built should include a label for each vertex giving the term in $(a+b+c)^n$ which corresponds to that particular vertex.
- The structure should go to at least level 4 (recall, the first level is known as level 0 [zero])
- Students may work in groups of not more than two.

Video (or possibly prezi, ppt, slide rocket, or google docs).

- Include a brief description of the construction method used. By description think picture. Can you figure out a way to use your ultrabook webcam to take digital images (like a still photo). Resource person, --- if you have any difficulty with this, see Tyler Snyder.
- Presentation lengths are STRICTLY limited to 3 min. Video
- Give this structure a name. What should it be called?
- Clearly show how this model is a 3-d version of the problem MrD refers to as the path problem. It is possible, but not required to "color code" the toothpicks or other connectors that are used.
- Recall the problem discussed in class that your instructor referred to as the cookie problem. Recall the problem went something like this: "A tray contains a seemingly endless supply of oreo, peanut butter, and oatmeal-raisin cookies. In how many ways may one select 8 cookies from this tray?" Clearly explain how this cookie problem relates to $(a+b+c)^n$, and what term on which level would give the answer to the cookie problem.
- Include one use for pascal's triangle (or this thing you've build a model for) which NO OTHER group has listed. Yes, that does give the first group to present an advantage. Yes, order in which groups present will be selected randomly. This brings to mind an interesting thought, if an analysis class has 20 different groups (some with one member and some with two) in how many different orders may these groups be asked to present their project. (Hint, I think that might be 20!!)
- Create a table that gives the following info:

Polynomial	Number of terms	Sum of coefficients
a^n		
$(a+b)^n$		
$(a+b+c)^n$		
...

Look for patterns and have your table go as far as it can go. Can you make the table extend to all possible cases? { Can you find a way to use the pochhammer symbol in this table [this might be considered a hint].}

- Give a clear answer to this question: Is it reasonable (possible to do) for MrD to ask the analysis classes to make a model of the ***thing-that's-one-level-beyond- the-thing-that's-one-level-beyond-pascal's-triangle***, which would model $(a + b + c + d)^n$